what and where, giving a lot of references and citations, so this monograph may serve as a secondary source of a lot of factual information. The author collected and organized it so that the reader is truly impressed by the wide flow of geometric thought, from Antiquity to modern times, in the East and in the West, each new step being a development and amplification of the previous ones, with new fruitful ideas being introduced, so that the flow becomes deeper, broader, and wider until it reaches us. Usually, when speaking of non-Euclidean geometry, one refers to the discoveries of Lobachevsky, Bolyai, and Gauss, mentioning also previous attempts to prove the Fifth Postulate, hyperbolic and elliptical geometries. The author was wise to include these achievements in a broader perspective of the human spirit's efforts to build up a more cogent, deeper insight into the nature and the concept of space.

DEAR RUSSELL-DEAR JOURDAIN. A COMMENTARY ON RUSSELL'S LOGIC, BASED ON HIS CORRESPONDENCE WITH PHILIP JOURDAIN. By I. Grattan-Guinness. London (Duckworth). 1977. 234 pp.

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This volume contains excerpts from the correspondence between Bertrand Russell and Philip Jourdain, with extensive analytic comments by the editor, Ivor Grattan-Guinness. The significance of the correspondence for a study of Bertrand Russell is obvious, since "it seems certain that Russell did not correspond with anyone else about his work in such great detail" (p. 5).

In the Prologue, the editor introduces the reader to the biographies of both Russell and Jourdain, carefully explaining "the nature of the surviving correspondence" as well as "the style, scope and limitations" of his commentary.

The pieces of correspondence, accompanied by Grattan-Guinness' analysis, are distributed through approximately 130 pages, from Chapter 5 through Chapter 24 of the volume. While the arrangement follows the chronological order, each chapter concentrates on a specific main topic. The variety of topics is impressive: mathematical as well as philosophical issues are broadly covered. For example, Chapter 5 has to do with the correspondence "March 1902-March 1903: Irrational numbers and the real line," whereas Chapter 13 concerns the correspondence "December 1905-January 1906: Denoting and the mysteries of existence."

Next there is an Epilogue, divided into four sections. In the first of these, "The relationship between Russell and Jourdain," the editor presents a general evaluation of the intellectual exchange between the two men. In the second section of

the Epilogue, Grattan-Guinness offers a translation (from the French) of Russell's "Sur les axiomes de l'infini." The two other sections include notes by Jourdain in *The Granta*, the humorous magazine of Cambridge University at the turn of the century, and Jourdain's notes on his copy of *Principia*.

There follows a 25-page "Bibliography of published works" which is in itself a valuable research aid for anyone interested in the history of modern logic and the foundations of mathematics.

The volume is provided with a "Glossary of principal notations" and with an "Index of documents used." Finally, an "Index of names of persons" and an "Index of subjects" facilitate (especially the latter) the reader's work through the maze of changing terminologies and historical figures.

Four plates increase the attractiveness of this book: photographs of Frege, Cantor, Jourdain, and Russell (the last accompanied by an unidentified person).

One prominent topic in this correspondence, on the set-theoretical side, is well-ordering. Jourdain insisted that he had found a proof. The entire correspondence tragically finishes with the following complaint by Laura Jourdain to Russell: "You made him so unhappy by your inability to see his well-ordering" (p. 153).

On the more philosophical side, there are various remarks by Russell on the class-as-one, class-as-many distinction: "You will see that in my book [*The Principles*] (p. 104, art. 104) I suggest that certain functions do not determine a *class as one*. This is practically the same doctrine as that they do not determine a class, for a *class as many* is not an entity" (p. 78). "What was wrong was assuming individuals which have no being. I think it is demonstrable that inconsistent classes are not classes or anything else, but are merely mistakes. I now extend this to *all* classes [emphasis Russell's]. The error seems to me to lie in supposing that many entities ever combine to form one new entity, the class composed of them. In the particular case of inconsistent classes, this can (I think) be *proved* [emphasis Russell's]; in other cases I adopt it as the simplest and most convenient hypothesis" (p. 68).

That *some* classes exist only as many had been recognized already in the scholastic tradition and by Cantor [1]; here Russell generalizes this view to all classes without exception, while pointing out that classes as many do not exist, so that as a result we have the full "no class" theory.

The topic of abstraction ("definitions by abstractions") not surprisingly comes up several times (pp. 14, 15, 76, 129). Grattan-Guinness simply says that Russell "reduced definition by abstraction to definition in terms of equivalence classes" (p. 15). I believe that a more profound and in fact negative criticism of Russell's theory in this respect would have been in order. The "definition in terms of equivalence classes" badly

needs clarification [2]. But of course, given the wide variety of issues covered, it is inevitable that readers or reviewers find themselves occasionally in disagreement with the editor.

From an editorial point of view, the volume is complex. The reader should proceed cautiously, making good note of the various conventions, systems of quotation (for example, p. 10), uses of quotation marks (p. 29), distinction of two senses of the word "existence" in "existence of classes" (p. 15), etc. It might have been helpful to print Jourdain's and Russell's texts in types different from each other as well as from Grattan-Guinness' commentary. To mention one rare misprint: p. 152, line 3, should be "hear" instead of "here."

All in all, the volume exemplifies work in the history of logic, set theory, and philosophy at its best. Sophisticated historiographical scholarship and fine understading of the issues are unusually well combined in Grattan-Guinness' *Dear Russell-Dear Jourdain*.

NOTES

1. Compare I. Angelelli, Class as one and class as many before modern set theory. *Historia Mathematica* 6 (1979), 305-309.

2. Compare I. Angelelli, Abstraction, looking-around and semantics, in *Studia Leibnitiana*, Sonderheft 8, to appear.

A CRITICAL STUDY OF THE YANG HUI SUAN FA; A THIRTEENTH-CENTURY CHINESE MATHEMATICAL TREATISE. By Lam Lay Yong (L.Y. Lam). Singapore (University Press). 1977. xx + 360 pp.

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Although there were giants in the past, such as Li Yen and Ch'ien Pao-Tsung, or Mikami Yoshio, there are very few scholars today who work on the history of Chinese mathematics, in spite of its crucial importance as one of the basic components of the Old World civilizations. Outstanding, however, are Elvira Ivanovna Berezkina in the Soviet Union and Ulrich Libbrecht in Belgium. By the publication of her present book, Lam Lay-Yong (Lin Wên Li-Jung) has joined this very select company. She is quite right to say in her preface that although much is known of the history of early Chinese mathematics, a critical and detailed study of a complete ancient or mediaeval Chinese mathematical treatise, together with its translation into any Western language, is very rare.